

## Polar Decompositions in Air

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205. Finally, a series of four small compound conductors, consisting of litmus and turmeric paper (fig. n) moistened in solution of sulphate of soda, were supported on glass rods, in a line at a little distance from each other, between the points *p* and *n* of the machine and discharging train, so that the electricity might pass in succession through them, entering in at the litmus points *b, b*, and passing out at the turmeric points *a, a*. On working the machine carefully, so as to avoid sparks and

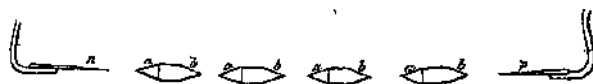


Fig. n.

brushes (58), I soon obtained evidence of decomposition in each of the moist conductors, for all the litmus points exhibited free acid, and the turmeric points equally showed free alkali.

206. On using solutions of iodide of potassium, acetate of lead, etc., similar effects were obtained; but as they were all consistent with the results above described, I refrain from describing the appearances minutely.

207. These cases of electro-chemical decomposition are in their nature exactly of the same kind as those affected under ordinary circumstances by the voltaic battery, notwithstanding the great differences as to the presence or absence, or at least as to the nature of the parts usually called poles; and also of the final situation of the elements eliminated at the electrified boundary surfaces (203). They indicate at once an internal action of the parts suffering decomposition, and appear to show that the power which is effectual in separating the elements is exerted there, and not at the poles. But I shall defer the consideration of this point for a short time (229, 254), that I may previously consider another supposed condition of electro-chemical decomposition.<sup>1</sup>

<sup>1</sup>I find (since making and describing these results) from a note to Sir Humphry Davy's paper in the *Philosophical Transactions*, 1807, p. 31, that that philosopher, in repeating Wollaston's experiment of the decomposition of water by common electricity (63, 66) used an arrangement somewhat like some of those I have described. He immersed a guarded platina point connected with the machine in distilled water, and dissipated the electricity from the water into the air by moistened filaments of cotton. In this way

he states that he obtained oxygen and hydrogen *separately*  
from each other.  
This experiment, had I known of it, ought to have been  
quoted in an earlier part of these Researches (78); but it does not  
remove any of the objections I have made to the use of Wollaston's  
apparatus as a test of true chemical action (67).